AMENDMENTS TO THE CLAIMS

1. (Currently Amended) An optical system comprising:

a source for producing optical signals;

an optical waveguide having a noise producing element and an optical filter element;

a receiver for converting applied optical signals into electrical signals;

a coupler for coupling said produced optical signals into said optical waveguide and for coupling reflections from said noise producing element and from said optical filter element to said receiver as applied optical signals; and

a noise reduction system for producing a frequency spectrum of the electrical signals and removing noise produced by said noise producing element from said electrical signals, wherein the noise reduction system performs a frequency analysis of the electrical signals to identify a periodic noise, from said noise producing element, which is removed from the electrical signals using frequency based gating of the frequency spectrum.

2. (Original) The system of claim 1 wherein the noise reduction system averages broadband noise and then subtracts the averaged level from the electrical signals.

3-5. (Canceled)

6. (Previously Presented) The system of claim 28, wherein the frequency analysis is a Fourier analysis.

7. (Canceled)

8. (Original) The system of claim 1 wherein the optical filter element includes a fiber Bragg grating.

9. (Original) The system of claim 1 wherein the optical waveguide includes a discontinuity.

10 (Original) The system of claim 1 wherein the discontinuity is a splice.

11. (Currently Amended) A sensor comprising:

a source for producing optical signals;

an optical waveguide having a noise producing element and an optical filter element;

a receiver for converting applied optical signals into amplified electrical signals;

a coupler for coupling said produced optical signals into said optical waveguide and for coupling reflections from said optical waveguide as applied optical signals to said receiver; and

a signal processor for producing a frequency spectrum of the electrical signals and removing noise produced by said noise producing element from said electrical signals, wherein signal processor performs a frequency analysis of the electrical signals to identify and remove a periodic noise, from the noise producing element, which is removed from the electrical signals using frequency based gating of the frequency spectrum.

12. (Original) The sensor of claim 11 wherein said signal processor subtracts an averaged noise level from the electrical signals.

13. (Canceled)

14. (Previously Presented) The sensor of claim 31, wherein the frequency analysis is a Fourier analysis.

15. (Canceled)

16. (Original) The sensor of claim 11 wherein the source includes a tunable laser.

17. (Original) The sensor of claim 11 wherein the source includes a broadband light source and a tunable filter.

18. (Original) The system of claim 11 wherein the optical filter element includes a fiber Bragg grating.

19. (Original) The system of claim 11 wherein the optical waveguide includes a discontinuity.

20. (Previously Presented) The system of claim 19 wherein the discontinuity is a splice.

21. (Currently Amended) A method of compensating for optical reflection comprising:

producing an optical signal;

coupling the optical signal into an optical waveguide having a noise producing element and an optical filter element;

converting reflections along the optical waveguide into electrical signals; and

removing noise produced by the noise producing element from the electrical signals such that the electrical signals from the optical filter element are retained, wherein gating out periodic noise produced by the noise producing element from the electrical signals includes producing a frequency spectrum of the electrical signals and using frequency based gating to remove a first signal varying rapidly relative to a second signal as determined by a frequency analysis of the frequency spectrum.

22. (Original) The method of claim 21 wherein removing noise includes finding an average noise level and subtracting that average noise level from the electrical signals.

23-25. (Canceled)

26. (Previously Presented) The sensor of claim 31, wherein said signal processor identifies periodic noise by identifying a rapidly varying signal from the frequency analysis.

27-28. (Canceled)

29. (Previously Presented) The system of claim 1, wherein the frequency based gating comprises of selecting a bandwidth where periodic noise has been identified and removing the bandwidth from the electrical signals.

30. (Previously Presented) The system of claim 28, wherein the noise reduction system identifies periodic noise by identifying a rapidly varying signal from the frequency analysis.

31-33. (Canceled)